

# Claims

- [c1] 1. A door closer for automatically moving a door in a closing direction, the door positioned within a door frame and hinged along one edge to the door frame for movement between a closed position and an open position, the door closer comprising:
- a housing having a first closed end and an open second end and defining an interior cavity including a cylindrical recess spaced from the first end of the housing;
  - a spindle journaled in the housing adjacent the first end of the housing for rotation about an axis, at least a portion of the spindle extending from the housing and adapted to be connected to turn with the door;
  - a cam carried by the spindle for rotation with the spindle about the axis through an arc in a first direction from a first angular orientation corresponding to the closed position of the door to a second angular orientation corresponding to an open position of the door and about the axis through an arc in an opposite direction from the second angular orientation to the first angular orientation, wherein rotation of the cam from the first angular orientation to the second angular orientation corresponds to movement of the door in the opening direc-

tion and rotation of the cam from the second angular orientation to the first angular orientation corresponds to movement of the door in the closing direction;

a slide assembly including a cam following roller for cooperating with the cam for converting rotation of the cam into linear movement of the slide assembly relative to the housing;

a piston having a first end and a second end, the piston slidably disposed in the cylindrical recess;

a piston rod connected at one end to the first end of the piston and at the other end to the slide assembly;

spring means disposed outside of the housing for urging the piston, the slide assembly and the cam in the door closing direction, the spring means including a spring rod connected at one end to the second end of the piston;

first and second annular plugs disposed in the housing adjacent the ends of the cylindrical recess for slidably sealingly receiving the piston rod and the spring rod, respectively, the first and second annular plugs and piston dividing the cylindrical recess into a first chamber between the first annular plug and the first end of the piston and a second chamber between the second annular plug and the second end of the piston;

passage means defined in the housing for permitting flow of fluid between the cylindrical recess and the space

of the cavity defined between the first annular plug and the closed end of the housing in response to reciprocation of the piston in the cylindrical recess, wherein upon rotation of the spindle and cam in the door opening direction the cam operates against the cam following roller for moving the slide assembly toward the first end of the housing and the piston toward the first end of the cylindrical recess and compressing the spring means for storing energy, the spring means urging the piston toward the second end of the cylindrical recess for moving the slide assembly toward the second end of the housing and the cam following roller against the cam to rotate the cam and the spindle in the door closing direction.